N2215 SAS/SATA HBA for IBM System x

IBM Redbooks Product Guide

The N2215 SAS/SATA HBA for IBM® System x® is an ideal solution for System x servers that require high-speed internal storage connectivity. This eight-port host bus adapter supports direct attachment to SAS and SATA internal HDDs and SSDs. With a low-profile form-factor design, the N2215 SAS/SATA HBA offers two x4 internal mini-SAS HD connectors.

The following figure shows the N2215 SAS/SATA HBA for IBM System x.

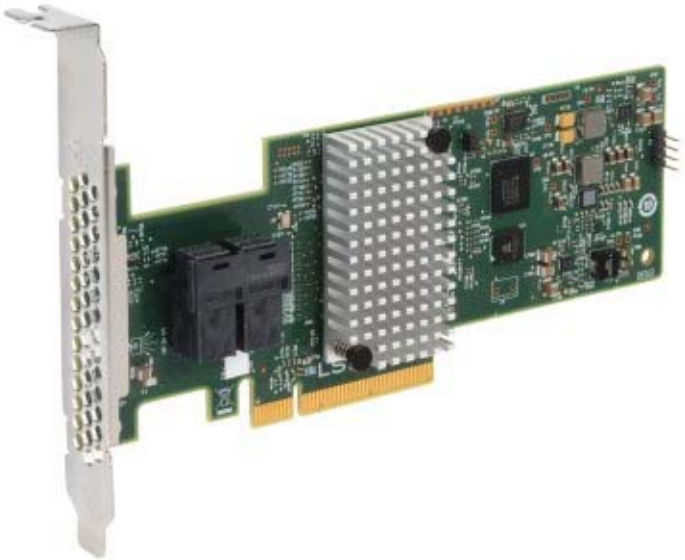

Figure 1. N2215 SAS/SATA HBA for IBM System x

Did you know?

The N2215 SAS/SATA HBA provides high performance for storage connectivity for servers by integrating the latest enhancements in PCI Express and SAS technology, offering eight lanes of 12 Gbps SAS matched with eight lanes of PCIe 3.0 to eliminate performance bottlenecks.

The N2215 SAS/SATA HBA supports SAS and SATA data transfer rates of 3, 6, and 12 Gbps per lane, and it enables maximum connectivity and performance in a low-profile form factor.

Rigorous testing of the N2215 SAS/SATA HBA by IBM through the IBM ServerProven® program ensures a high degree of confidence in storage subsystem compatibility and reliability. Providing an additional peace of mind, the controller is covered under IBM warranty.

Part number information

The following table provides the ordering part numbers and feature codes.

Table 1. Ordering part numbers and feature codes

Description	Part number	Feature code
N2215 SAS/SATA HBA for IBM System x	47C8675	A3YY

The N2215 option part number includes the following items:

- One N2215 adapter with a full-height (3U) bracket
- One low-profile (2U) bracket
- Warranty Flyer
- Documentation CD
- Important Notices Flyer

Features and specifications

The N2215 SAS/SATA HBA has the following features and specifications:

- LSI SAS3008 12 Gbps controller
- PCI low profile, half-length - MD2 form factor
- PCI Express 3.0 x8 host interface
- Eight internal 12 Gbps SAS/SATA ports (support for 12, 6, or 3 Gbps SAS speeds and 6 or 3 Gbps SATA speeds)
- Up to 12 Gbps throughput per port
- Two internal x4 HD Mini-SAS connectors (SFF-8643)
- Non-RAID (JBOD mode) support for SAS and SATA HDDs and SSDs (RAID not supported)
- Optimized for SSD performance
- High-performance IOPS LSI Fusion-MPT architecture
- Advanced power management support
- Support for SSP, SMP, STP, and SATA protocols
- End-to-End CRC with Advanced Error Reporting
- T-10 Protection Model for early detection of and recovery from data corruption
- Spread Spectrum Clocking for EMI reductions

Supported servers

The following table lists the compatibility information for the N2215 HBA and IBM System x and IBM iDataPlex® servers and their internal storage expansion options.

Table 2. System x and iDataPlex compatibility (Part 1)

Part number	Description	x3100 M4 (2582)	x3250 M4 (2583)	x3300 M4 (7382)	x3500 M4 (7383, E5-2600)	x3530 M4 (7160)	x3550 M4 (7914, E5-2600)	x3630 M4 (7158)	x3650 M4 (7915, E5-2600)	x3690 X5 (7147)	x3750 M4 (8722)	x3850 X5 (7143)	dx360 M4 (7912, E5-2600)
Adapter													
47C8675	N2215 SAS/SATA HBA	N	N	N	Y*	N	Y*	N	Y*	N	N	N	N
Storage													
46W9242	Add'l 8x 2.5" Hot-Swap SAS/SATA Upgrade Kit for 16 or 24 HDDs (12Gb)**	N	N	N	Y*	N	N	N	N	N	N	N	N
46W9243	Add'l 8x 2.5" Hot-Swap SAS/SATA Upgrade Kit for 32 HDDs (12Gb)**	N	N	N	N	N	N	N	N	N	N	N	N
None***	x3550M4 4x 2.5" HS HDD Assembly Kit for 12Gb RAID	N	N	N	N	N	Y*	N	N	N	N	N	N
00Y7297	x3550M4 2.5" HDD Assembly Kit for 12Gb RAID	N	N	N	N	N	Y*	N	N	N	N	N	N
00Y8597	x3550M4 mini-SAS Cable Kit for 12Gb RAID	N	N	N	N	N	Y*	N	N	N	N	N	N
None***	x3650M4 8x 2.5" HS HDD Assembly Kit for 12Gb RAID	N	N	N	N	N	N	N	Y*	N	N	N	N
00Y7627	x3650M4 16x 2.5" HS HDD Assembly Kit with Expander for 12Gb RAID	N	N	N	N	N	N	N	Y*	N	N	N	N
00Y7626	x3650M4 16x 2.5" HS HDD Assembly Kit for 12Gb RAID	N	N	N	N	N	N	N	Y*	N	N	N	N
46W4206	x3650 M4 HD Plus 8 x 2.5" HS HDD Assembly Kit	N	N	N	N	N	N	N	N	N	N	N	N
00Y7658	x3650 M4 HD 3 x 8 2.5" HS HDD Assembly Kit	N	N	N	N	N	N	N	N	N	N	N	N
46W4205	x3650 M4 HD Plus 16 x 1.8" SSD Assembly Kit	N	N	N	N	N	N	N	N	N	N	N	N

* Support is planned for later in 2013.
** The N2215 supports up to 16 SSDs in the x3500 M4.
*** Available only through CTO or special bid.

Table 2. System x and iDataPlex compatibility (Part 2)

Part number	Description	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 HD (5460)	dx360 M4 (7912, E5-2600 v2)	nx360 M4 (5455)
Adapter							
47C8675	N2215 SAS/SATA HBA	Y*	Y*	Y*	Y	N	N
Storage							
46W9242	Add'l 8x 2.5" Hot-Swap SAS/SATA Upgrade Kit for 16 or 24 HDDs (12Gb)**	Y*	N	N	N	N	N
46W9243	Add'l 8x 2.5" Hot-Swap SAS/SATA Upgrade Kit for 32 HDDs (12Gb)**	N	N	N	N	N	N
None***	x3550M4 4x 2.5" HS HDD Assembly Kit for 12Gb RAID	N	Y*	N	N	N	N
00Y7297	x3550M4 2.5" HDD Assembly Kit for 12Gb RAID	N	Y*	N	N	N	N
00Y8597	x3550M4 mini-SAS Cable Kit for 12Gb RAID	N	Y*	N	N	N	N
None***	x3650M4 8x 2.5" HS HDD Assembly Kit for 12Gb RAID	N	N	Y*	N	N	N
00Y7627	x3650M4 16x 2.5" HS HDD Assembly Kit with Expander for 12Gb RAID	N	N	Y*	N	N	N
00Y7626	x3650M4 16x 2.5" HS HDD Assembly Kit for 12Gb RAID	N	N	Y*	N	N	N
46W4206	x3650 M4 HD Plus 8 x 2.5" HS HDD Assembly Kit	N	N	N	Y	N	N
00Y7658	x3650 M4 HD 3 x 8 2.5" HS HDD Assembly Kit	N	N	N	Y	N	N
46W4205	x3650 M4 HD Plus 16 x 1.8" SSD Assembly Kit	N	N	N	Y	N	N

* Support is planned for later in 2013.
** The N2215 supports up to 16 SSDs in the x3500 M4.
*** Available only through CTO or special bid.

For more information about the System x servers that support each adapter, see the IBM ServerProven website:
http://ibm.com/servers/eserver/serverproven/compat/us/

Supported drives

The N2215 SAS/SATA HBA supports the drives that are supported in the servers that are listed in the following table. The maximum number of drives that can be connected to the HBA is limited by the maximum number of internal drive bays for a supported server (other configuration limitations may apply).

Table 3. Drive compatibility (Part 1)

Part number	Description	x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 HD (5460)
1.8-inch SATA SSDs								
49Y5834	IBM 64GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	N	N	Y
00W1222	IBM 128GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	N	N	Y
00W1227	IBM 256GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	N	N	Y
49Y5993	IBM 512GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	N	N	Y
00W1120	IBM 100GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	N	N	Y
49Y6119	IBM 200GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	N	N	Y
49Y6124	IBM 400GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	N	N	Y
00AJ040	S3500 80GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	N	N	N
00AJ045	S3500 240GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	N	N	N
00AJ050	S3500 400GB SATA 1.8" MLC Enterprise Value SSD	N	N	N	N	N	N	N
41Y8366	S3700 200GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	N	N	N
41Y8371	S3700 400GB SATA 1.8" MLC Enterprise SSD	N	N	N	N	N	N	N
2.5-inch NL SAS HS HDDs								
90Y8953	IBM 500GB 7.2K 6Gbps NL SAS 2.5" SFF G2HS HDD	N	N	Y*	Y*	Y*	Y*	Y
81Y9690	IBM 1TB 7.2K 6Gbps NL SAS 2.5" SFF HS HDD	N	N	Y*	Y*	Y*	Y*	Y
2.5-inch NL SATA HS HDDs								
81Y9722	IBM 250GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	N	N	Y*	Y*	Y*	Y*	N
81Y9726	IBM 500GB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	N	N	Y*	Y*	Y*	Y*	N
81Y9730	IBM 1TB 7.2K 6Gbps NL SATA 2.5" SFF HS HDD	N	N	Y*	Y*	Y*	Y*	N

* Support is planned for later in 2013.

Table 3. Drive compatibility (Part 2)

Part number	Description	x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 HD (5460)
2.5-inch SAS HS HDDs								
90Y8926	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS HDD	N	N	Y*	Y*	Y*	Y*	Y
90Y8944	IBM 146GB 15K 6Gbps SAS 2.5" SFF G2HS SED	N	N	Y*	Y*	Y*	Y*	N
90Y8877	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	N	N	Y*	Y*	Y*	Y*	Y
90Y8913	IBM 300GB 10K 6Gbps SAS 2.5" SFF G2HS SED	N	N	Y*	Y*	Y*	Y*	N
81Y9670	IBM 300GB 15K 6Gbps SAS 2.5" SFF HS HDD	N	N	Y*	Y*	Y*	Y*	Y
90Y8872	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS HDD	N	N	Y*	Y*	Y*	Y*	Y
00AD102	IBM 600GB 10K 6Gbps SAS 2.5" G2HS Hybrid	N	N	Y*	Y*	Y*	Y*	N
90Y8908	IBM 600GB 10K 6Gbps SAS 2.5" SFF G2HS SED	N	N	Y*	Y*	Y*	Y*	N
81Y9662	IBM 900GB 10K 6Gbps SAS 2.5" SFF G2HS SED	N	N	Y*	Y*	Y*	Y*	Y
81Y9650	IBM 900GB 10K 6Gbps SAS 2.5" SFF HS HDD	N	N	Y*	Y*	Y*	Y*	Y
00AD075	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS HDD	N	N	Y*	N	Y*	N	N
00AD085	IBM 1.2TB 10K 6Gbps SAS 2.5" G2HS SED	N	N	Y*	N	Y*	N	N
2.5-inch SAS HS SSDs								
49Y6129	IBM 200GB SAS 2.5" MLC HS Enterprise SSD	Y*	Y*	Y*	Y*	Y*	Y*	Y
49Y6134	IBM 400GB SAS 2.5" MLC HS Enterprise SSD	Y*	Y*	Y*	Y*	Y*	Y*	Y
49Y6139	IBM 800GB SAS 2.5" MLC HS Enterprise SSD	Y*	Y*	Y*	Y*	Y*	Y*	Y
49Y6195	IBM 1.6TB SAS 2.5" MLC HS Enterprise SSD	Y*	Y*	Y*	Y*	Y*	Y*	N

* Support is planned for later in 2013.

Table 3. Drive compatibility (Part 3)

Part number	Description	x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 HD (5460)
2.5-inch SATA HS SSDs								
00W1125	IBM 100GB SATA 2.5" MLC HS Enterprise SSD	Y*	Y*	Y*	Y*	Y*	Y*	Y
49Y5839	IBM 64GB SATA 2.5" MLC HS Enterprise Value SSD	Y*	Y*	Y*	Y*	Y*	Y*	Y
90Y8648	IBM 128GB SATA 2.5" MLC HS Enterprise Value SSD	Y*	Y*	Y*	Y*	Y*	Y*	Y
90Y8643	IBM 256GB SATA 2.5" MLC HS Enterprise Value SSD	Y*	Y*	Y*	Y*	Y*	Y*	Y
49Y5844	IBM 512GB SATA 2.5" MLC HS Enterprise Value SSD	Y*	Y*	Y*	Y*	Y*	Y*	Y
00AJ000	S3500 120GB SATA 2.5" MLC HS Enterprise Value SSD	Y*	Y*	Y*	Y*	Y*	Y*	N
00AJ005	S3500 240GB SATA 2.5" MLC HS Enterprise Value SSD	Y*	Y*	Y*	Y*	Y*	Y*	N
00AJ010	S3500 480GB SATA 2.5" MLC HS Enterprise Value SSD	Y*	Y*	Y*	Y*	Y*	Y*	N
00AJ015	S3500 800GB SATA 2.5" MLC HS Enterprise Value SSD	Y*	Y*	Y*	Y*	Y*	Y*	N
41Y8331	S3700 200GB SATA 2.5" MLC HS Enterprise SSD	Y*	Y*	Y*	Y*	Y*	Y*	N
41Y8336	S3700 400GB SATA 2.5" MLC HS Enterprise SSD	Y*	Y*	Y*	Y*	Y*	Y*	N
41Y8341	S3700 800GB SATA 2.5" MLC HS Enterprise SSD	Y*	Y*	Y*	Y*	Y*	Y*	N
2.5-inch SATA SS SSDs								
90Y8668	IBM 128GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	Y*	Y*	Y*	Y*	N
90Y8663	IBM 256GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	Y*	Y*	Y*	Y*	N
00AJ020	S3500 120GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	N	N	Y*	Y*	N
00AJ025	S3500 240GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	N	N	Y*	Y*	N
00AJ030	S3500 480GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	N	N	Y*	Y*	N
00AJ035	S3500 800GB SATA 2.5" MLC SS Enterprise Value SSD	N	N	N	N	Y*	Y*	N

* Support is planned for later in 2013.

Table 3. Drive compatibility (Part 4)

Part number	Description	x3500 M4 (7383, E5-2600)	x3500 M4 (7383, E5-2600 v2)	x3550 M4 (7914, E5-2600)	x3550 M4 (7914, E5-2600 v2)	x3650 M4 (7915, E5-2600)	x3650 M4 (7915, E5-2600 v2)	x3650 M4 HD (5460)
3.5-inch NL SAS HS HDDs								
90Y8567	IBM 1TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
00W1533	IBM 2TB 7.2K 6Gbps NL SAS 3.5" G2HS SED	N	N	Y*	Y*	Y*	Y*	N
90Y8572	IBM 2TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
90Y8577	IBM 3TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
00W1543	IBM 4TB 7.2K 6Gbps NL SAS 3.5" G2HS SED	N	N	Y*	Y*	Y*	Y*	N
49Y6210	IBM 4TB 7.2K 6Gbps NL SAS 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
3.5-inch NL SATA HS HDDs								
81Y9786	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
81Y9790	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
81Y9794	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
81Y9798	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
49Y6002	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
3.5-inch NL SATA SS HDDs								
81Y9802	IBM 500GB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	N	N	Y*	Y*	Y*	Y*	N
81Y9806	IBM 1TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	N	N	Y*	Y*	Y*	Y*	N
81Y9810	IBM 2TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	N	N	Y*	Y*	Y*	Y*	N
81Y9814	IBM 3TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	N	N	Y*	Y*	Y*	Y*	N
49Y6012	IBM 4TB 7.2K 6Gbps NL SATA 3.5" G2SS HDD	N	N	Y*	Y*	Y*	Y*	N
3.5-inch SAS HS HDDs								
49Y6092	IBM 300GB 15K 6Gbps SAS 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
49Y6097	IBM 450GB 15K 6Gbps SAS 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N
49Y6102	IBM 600GB 15K 6Gbps SAS 3.5" G2HS HDD	N	N	Y*	Y*	Y*	Y*	N

* Support is planned for later in 2013.

Supported operating systems

The N2215 SAS/SATA HBA supports the following operating systems:

- Microsoft Windows Server 2012
- Microsoft Windows Server 2008 R2
- Microsoft Windows Server 2008, Datacenter x64 Edition
- Microsoft Windows Server 2008, Datacenter x86 Edition
- Microsoft Windows Server 2008, Enterprise x64 Edition
- Microsoft Windows Server 2008, Enterprise x86 Edition
- Microsoft Windows Server 2008, Standard x64 Edition
- Microsoft Windows Server 2008, Standard x86 Edition
- Microsoft Windows Server 2008, Web x64 Edition
- Microsoft Windows Server 2008, Web x86 Edition
- Red Hat Enterprise Linux 6 Server x64 Edition
- Red Hat Enterprise Linux 6 Server Edition
- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- SUSE Linux Enterprise Server 11 for AMD64/EM64T
- SUSE Linux Enterprise Server 11 for x86
- VMware vSphere 5.1 (ESXi)

For more information about the specific versions and service levels that are supported and any other prerequisites, see the IBM ServerProven website:
http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/nos/matrix.shtml

Warranty

The N2215 SAS/SATA HBA carries a 1-year limited warranty. When installed in a supported System x server, the adapter assumes your system's base warranty and any IBM ServicePac® upgrade.

Physical specifications

The N2215 SAS/SATA HBA has the following physical specifications:

Dimensions (approximate):

- Height: 17 mm (0.7 in.)
- Width: 69 mm (2.7 in.)
- Depth: 170 mm (6.7 in.)
- Weight: 88 g (0.2 lb)

Shipping dimensions (approximate):

- Height: 51 mm (2.0 in.)
- Width: 143 mm (5.6 in.)
- Depth: 238 mm (9.4 in.)
- Weight: 310 g (0.7 lb)

Operating environment

The N2215 SAS/SATA HBA is supported in the following environment:

- Temperature (operational): 5 - 40 °C (41 - 104 °F) at 0 - 5,000 m (0 - 16,404 ft)
- Temperature (non-operational): -40 - 60 °C (-40 - 140 °F) at 10,700 m (35,105 ft)
- Relative humidity: 8% - 93% (non-condensing)
- Maximum altitude: 10,700 m (35,105 ft)

Agency approvals

The N2215 SAS/SATA HBA conforms to the following regulations:

- UL
- cUL
- IEC60950
- EMC
- FCC
- TUV
- CE
- VCCI
- BSMI
- C-tick
- KC

Related publications and links

For more information, see the following documents:

- IBM US Announcement Letter
  http://ibm.com/common/ssi/cgi-bin/ssialias?infotype=dd&subtype=ca&&htmlfid=897/ENUS113-161
- IBM 6 Gb and 12 Gb MPT2SAS Controller documentation - IBM Systems
  http://ibm.com/support/entry/portal/docdisplay?lndocid=MIGR-5088601
- N2215 support and downloads
  http://ibm.com/support/entry/portal/search_results?q=N2215
- IBM System x Configuration and Options Guide
  http://ibm.com/systems/xbc/cog/
- IBM ServerProven
  http://ibm.com/servers/eserver/serverproven/compat/us/

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